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Original Article

Return to sport after surgical treatment for pubalgia among professional soccer players^{☆,☆☆}

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ABSTRACT

Objective: to evaluate the return to sport after surgical treatment for pubalgia among 30 professional soccer players and describe the surgical technique used.

Method: this case series was evaluated by means of a questionnaire and physical examination on 30 male professional soccer players of mean age 24.4 years (range: 18–30). The mean duration of the symptoms was 18.6 months (range: 13–28). The diagnosis was made through clinical investigation, special maneuvers and complementary examinations, by the same examiner. All the patients underwent surgical treatment after conservative treatment failed; all procedures were performed by the same surgeon using the same technique. Non-parametric comparisons were made to investigate the time taken to recover after the surgery, for the patients to return to their sport.

Results: five patients evolved with hematoma, with the need to remove the stitches three weeks after the operation because of a small dehiscence at the site of the operative wound. The wound healed completely in all these cases by five weeks after the surgery. Four patients presented dysuria in the first week, but improved in the second postoperative week. The mean time taken to return to training was around eight weeks (range: seven–nine). All the players returned to competitive soccer practice within 16 weeks. When asked about their degree of satisfaction after the operation (satisfied or dissatisfied), taking into consideration their return to the sport, there was 100% satisfaction, and they returned to professional practice at the same competitive level as before the injury. This degree of satisfaction continued to the last assessment, which was made after 36 months of postoperative follow-up.

Conclusion: the surgical technique presented in this case series, with trapezoidal resection of the pubic symphysis in association with bilateral partial tenotomy of the long adductor, was a fast and effective procedure with a low rate of postoperative complications. It was shown to be an excellent treatment option for refractory cases, with a return to sports activity among professional soccer players.

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Retorno ao esporte após tratamento cirúrgico de pubeíte em jogadores de futebol profissional

R E S U M O

Palavras-chave:

Sínfise púbica/cirurgia

Esportes

Futebol

Objetivo: avaliar o retorno ao esporte após tratamento cirúrgico da pubeíte em 30 jogadores de futebol profissional e descrever a técnica cirúrgica empregada.

Método: série de casos por meio de questionário e exame físico em 30 jogadores de futebol profissional. Atletas masculinos, com idade média de 24,4 anos (18 a 30). A duração média dos sintomas foi de 18,6 meses (13 a 28). O diagnóstico foi feito por meio de investigação clínica, manobras especiais e exames complementares por um mesmo examinador. Todos os pacientes foram submetidos ao tratamento cirúrgico após falha do tratamento conservador, pelo mesmo cirurgião e com a mesma técnica. A comparação não paramétrica foi efetuada para investigar o tempo de recuperação após a cirurgia para retorno ao esporte.

Resultados: cinco pacientes evoluíram com hematoma e foi necessária a retirada dos pontos com três semanas por causa de pequena deiscência no local da ferida operatória. Houve cicatrização completa da ferida em todos esses casos após cinco semanas. Quatro pacientes apresentaram disúria na primeira semana, porém melhoraram na segunda semana pós-operatória. O tempo médio para retorno aos treinos ocorreu em torno de oito semanas (sete a nove). Todos os atletas retornaram à prática de futebol competitivo em até 16 semanas. Quando interrogados sobre o grau de satisfação no pós-operatório (satisfeito ou insatisfeito), levando em consideração o retorno ao esporte, houve 100% de satisfação e retorno à prática profissional no mesmo nível competitivo prévio à lesão. Esse grau de satisfação persistiu até a última avaliação após 36 meses de seguimento pós-operatório.

Conclusão: a técnica cirúrgica apresentada nesta série de casos com ressecção trapezoidal da sínfise púbica associada a tenotomia parcial bilateral do adutor longo é um procedimento rápido, efetivo e com baixo índice de complicações pós-operatórias. Revela-se uma excelente opção de tratamento para os casos refratários e retorno à atividade esportiva em jogadores de futebol profissional.

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Introduction

Pubalgia in athletes is a non-infectious inflammatory condition of the pubic symphysis and adjacent structures.^{1,2} It was first described as a complication of urological surgical procedures and was correlated with local or distant infection.³ Subsequently, it was correlated with sports, especially in activities that require movements such as kicking, pulling away and running with abrupt changes in direction. Soccer, hockey, American football, rugby and long-distance running, among others, are some of the sports in which it occurs more frequently.⁴ Chronic pubic pain is common among soccer players.⁵ One of the factors involved in manifestation of the symptoms may be related to the biomechanical component involved in repeated kicking movements, which leads to recurrent overloading on the abdominal musculature, hip flexors and adductors. The incidence of this type of injury in soccer players ranges from 0.5% to 28%.^{1,2}

The main complaint is characterized by progressive pain in the region of the pubic symphysis, which may irradiate to the abdomen, perineum and adductors.¹ The pain may worsen with flexion of the trunk and sudden changes in direction during running and kicking movements. With persistence of the process, there is a decline in sports performance, with evolution to functional impotence and pain even when doing day-to-day activities.² In the genesis of pubalgia, a muscle

imbalance occurs, particularly between the abdominal musculature and the adductors, which is associated with pelvic instability. In professional soccer players, excessive numbers of games, overloading during training sessions, repeated muscle injuries and pitch surfaces in poor conditions contribute especially toward worsening this problem.⁵

The treatment for pubalgia is essentially conservative and consists of rest, physiotherapy, analgesics, non-steroidal anti-inflammatory drugs and corticoid infiltrations. However, in 5–10% of the cases, there is no improvement and surgical treatment is indicated.⁶ Only a few studies have analyzed the return to sports activities after surgical treatment of pubalgia.

The aim of the present study was to evaluate the return to sports activity after surgical treatment of pubalgia among professional soccer players and to describe the surgical technique used. The indications, stages of the surgery and postoperative clinical evolution are presented and discussed in this article.

Materials and methods

Between January 2000 and November 2008, a case series of 30 patients who were professional soccer players was studied. These patients underwent surgical treatment for pubalgia at the Sports Traumatology Center of Escola Paulista de Medicina, Federal University of São Paulo. This study was approved by the institution's Research Ethics Committee. All the players

Table 1 – Signs and symptoms considered.*Clinical condition*

- 1 – chronic pain in the pubic symphysis
- 2 – decline in performance
- 3 – pain when standing up on one leg
- 4 – pain on flexing the trunk

Physical examination

- 1 – forced adduction test (squeeze test)
- 2 – lateral compression test
- 3 – pain on palpation of the symphysis and adjacent structures
- 4 – pain on flexing the trunk
- 5 – pain on forced adduction

were male, with a mean age of 24.4 years (ranging from 18 to 30 years), and had had complaints of pain in the pubic region for at least one year, without any improvement through conservative treatment. The mean duration of the symptoms was 18.6 months (ranging from 13 to 28 months). Regarding the players' actions within the team, we divided these according to their positions in the field: seven defenders (one fullback and six wingers), 17 midfielders (eight right midfielders and nine left midfielders) and six attackers (two center-forwards and four strikers). Regarding dominance, there were six left-footers and 24 right-footers.

Professional soccer players for whom conservative treatment for at least 12 months had failed and who had been moved out of the main team were included in this study. All the patients had previously been assessed by a general surgeon, general clinician and/or urologist, who had ruled out other conditions that could mimic musculoskeletal pubalgia. All of the players had been diagnosed by means of clinical investigation, special maneuvers and complementary examinations conducted by an experienced examiner who was a specialist in hip surgery. Patients who presented infectious, rheumatic, abdominal or urological diseases or who had previously undergone pelvic surgical procedures were excluded from the sample. The presence of pelvic instability, as assessed using radiography when the patient was standing on one foot, was also considered to be an exclusion criterion with regard to surgical treatment of pubalgia.

The diagnosis was confirmed from the clinical picture, as shown in Table 1 and Fig. 1 and from imaging examinations as shown in Table 2 and Figs. 2 and 3.

In the complementary examinations, the radiographs showed narrowing of the pubic symphysis, osteoporosis, irregularities and signs of osteoarthritis (subchondral cysts, sclerosis and osteophytosis) (Fig. 2).

Table 2 – Main findings in imaging examinations.*Radiography*

- Irregularity of the margin of the pubic symphysis
 - Bone reabsorption
 - Bone sclerosis
 - Bone avulsion
 - Alterations at the sacroiliac
 - Vertical instability
- Magnetic resonance imaging*
- Bone marrow edema



Fig. 1 – Forced adduction test (squeeze test). Pain in the pubic symphysis caused by bilateral adduction against resistance. This can be made more sensitive through combination with abdominal flexion.



Fig. 2 – Radiograph of the pubic symphysis in a patient with pubalgia.

All the patients who underwent surgical treatment were operated by the same surgeon, using the same technique. Trapezoidal resection of the pubic symphysis was performed in association with bilateral tenotomy of the long adductor.

Description of the surgical technique

A surgical access was constructed anteriorly to the pubic symphysis, with a transverse incision of approximately 6 cm,

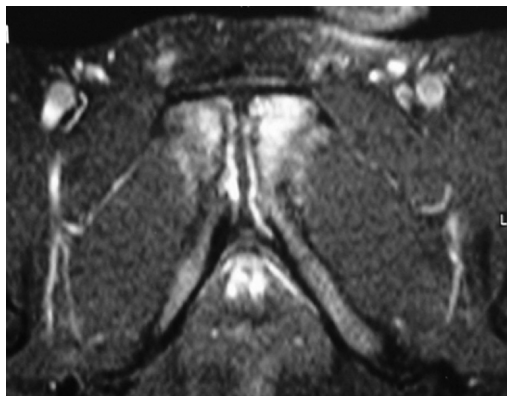


Fig. 3 – Magnetic resonance imaging.



Fig. 4 – Anterior access, around 1 cm above the pubic symphysis.



Fig. 5 – Release of the rectus abdominis.

centered 1 cm above the symphysis (Fig. 4). Dissection was performed so as to reach exposure of the rectus abdominis muscle and partial release of its fibers at the pubis (Fig. 5).

Following this, the anterior and superior ligaments of the pubic symphysis were identified and resected (Fig. 6). With the bladder protected by means of a spacer, the fibrocartilaginous disk and the adjacent degenerated structures were resected (Fig. 7). Osteophytes and free bodies were curetted. Special care was taken in identifying and maintaining the integrity



Fig. 6 – Resection of the anterior and superior ligaments of the pubic symphysis.

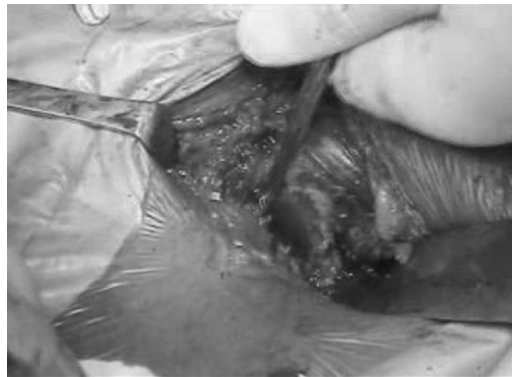


Fig. 7 – The bladder is protected and the fibrocartilaginous disk is curetted.

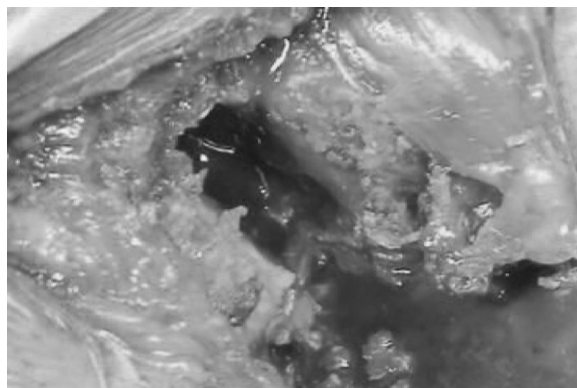


Fig. 8 – The arcuate ligament is preserved to avoid instability.

of the inferior arcuate ligament, so as to avoid evolution to pelvic instability (Fig. 8).

The incision was sutured in layers and a suction drain was emplaced after the operation, for 24–48 h (Fig. 9). After this period, bilateral partial tenotomy was performed on the long adductor under direct viewing, by means of a small incision close to its origin (Fig. 10).

All the players underwent the same rehabilitation protocol, as shown in Table 3.



Fig. 9 – Emplacement of a suction drain.



Fig. 10 – Bilateral tenotomy of the adductors.

Postoperative evaluations were performed after seven days, three, six, eight, 12 and 16 weeks and six, nine, 12, 24 and 36 months, by means of scores on a visual analog scale and evaluation of parameters such as range of motion, muscle strength (mainly the adductor and abdominal muscles) and gait. The patients were only allowed to return to the sport after reestablishment of pelvic joint movement and muscle strength (adductor and abdominal muscles), and if pain was absent during five consecutive training sessions and one complete soccer match.

A simple questionnaire was applied 36 months after the operation, with the questions listed below:

1. What is your assessment of the surgical treatment? (satisfied or dissatisfied)
2. Have you been able to return to practicing soccer? (yes or no)
3. Are you taking any medication or doing any treatment for this illness? (yes or no)

Results

The postoperative evaluations up to the third week were difficult for the soccer players because of edema and pain in

Table 3 – Postoperative rehabilitation protocol.

Use of abduction wedge while walking, sitting and sleeping, until the third week
Gait training without crutches
Avoidance of stretching of the abdominal and iliopsoas muscles until the third week
Aerobic exercises (bicycle or low-impact treadmill), from the third week onwards
Neuromuscular control, except for abdominal – 2nd to 3rd weeks
Removal of stitches after 21 days
Hydrotherapy – 3rd week
Neuromuscular assessment – 4th week
Training of specific muscle resistance – 4th and 5th weeks
Light walking – 5th week
Clinical assessment of muscle strength – 6th and 8th weeks
Running – 6th week
Plyometric training – 6th and 8th weeks
Return to training sessions – after 8th week

the region close to the incision, plus the fact that they were walking on crutches. Five patients evolved with hematoma and it was necessary to remove the stitches three weeks after the operation because of superficial dehiscence at the site of the operative wound. Complete healing of the wounds was observed in these cases after five weeks. Four patients presented dysuria in the first week, but improved in the second postoperative week. No cases of infection of the operative wound were observed.

The postoperative questionnaire was applied by the first author. In the postoperative assessments, the focus was on recovery of joint range of motion, identification of painful sites and reestablishment of adductor and abdominal muscle strength. Functional and balance assessments were made by specialized physiotherapist and consisted of testing unilateral single-leg hopping and bilateral jumping, and acceleration and deceleration in straight-line and cross movements.

The mean time taken to return to training was around eight weeks (ranging from seven to nine weeks). All the soccer players returned to competitive practice no later than the 16th week.

When the patients were asked about their degree of satisfaction after the operation (satisfied or dissatisfied), taking into consideration their return to sport, there was 100% satisfaction. This degree of satisfaction persisted until the last assessment, after 36 months of postoperative follow-up.

Radiographic controls using anteroposterior views of the pelvis with weight-bearing were performed every year until the third year after the operation, for all the patients, and there was no case of displacement of the pubic symphysis greater than 2 mm (one side in relation to the other). In addition, none of the patients presented any clinical complaints of instability over this period.

Discussion

Pubalgia is an imprecise term that is used as a synonym for certain conditions that cause pain in the region of the pubic symphysis.¹ The term is used preferentially to refer to inflammatory processes in the pubic symphysis, and can be said to be synonymous with pubic osteitis, particularly if the etiology is related to sports activities.² The anatomical complexity of this area makes it possible for there to be several differential diagnoses, which confound and delay identification of the main causal factor and consequently lead to ineffective and prolonged treatments.¹ In addition to causes relating to physical activity, other etiological factors can be considered in cases of pubalgia, such as: (a) non-infectious causes, generally associated with urological procedures; (b) infectious causes associated with problems localized in the symphysis or at a distance; (c) degenerative causes; or (d) rheumatological causes.¹ Correct early diagnosis of pubalgia is of prime importance within sports scenarios, particularly among professional soccer players, since this makes it possible to guide the prognosis relating to returning to competitive-level sports.^{4,5}

Among the therapeutic options recommended for pubalgia, most studies have recommended that the initial treatment should be conservative and should include: rest, motor

physiotherapy, analgesics, non-steroidal anti-inflammatory drugs and local corticoid infiltration.⁶ Corticoid infiltration has been widely used in cases that are refractory to conservative treatment with physiotherapy and non-steroidal anti-inflammatory drugs, but its efficacy is still a matter of controversy in the literature. The infiltrations may have little influence on the normal course of the disease.² On the other hand, improvement of the pain in the pubic symphysis after infiltrations with betamethasone and dexamethasone has also been reported.⁴ However, the follow-up on these patients was not long enough to evaluate whether the symptoms might have reappeared. In our study, we did not obtain this information relating to the number of infiltrations and the medications and dosages used, because of lack of information from the soccer players.

There is a lack of studies with a higher degree of evidence and other methods of non-surgical treatment such as ultrasonography, radiotherapy, anticoagulation and intravenous pamidronate have only been cited in some centers.^{3,6} Among these methods, only ultrasonography was used in our sample.

Surgical treatment is indicated if conservative treatment fails.⁶ Among the options described, there are four types of surgery: arthrodesis of the pubic symphysis, anterior resection, trapezoidal anterior resection and curettage.⁷ Surgical treatment consisting of trapezoidal resection of the pubic symphysis to relieve the symptoms has achieved good results in patients with pubalgia from causes unrelated to physical activity.⁷ Another study reported that two patients who underwent trapezoidal resection due to pubalgia relating to physical activity presented rapid clinical improvement.³ Another study presented the cases of 10 athletes who were operated using the trapezoidal resection technique, among whom 70% of the results were excellent after 96 months of observation. Out of the three cases for which the evolution was unsatisfactory, two presented pelvic instability.⁸ In our study, none of the patients presented pelvic instability up to the time of the last assessment.

More recently, some authors have recommended performing curettage of the pubic symphysis, which is a less invasive surgical procedure that does not involve bone resection and diminishes the exposure and the duration of the operation.^{9,10} The results from surgical treatment of pubalgia in two professional soccer players done by means of curettage in association with local infiltration six months after the surgery showed that both of them returned to their physical activities and subjectively considered that the surgical procedure had been a success.¹⁰ Another study presented 23 athletes who underwent curettage, with a functional scale divided into four categories. Grade 4: patients who were able to perform all of their activities without pain; grade 3: patients who were able to run but were unable to participate in all the activities; grade 2: patients who were unable to run, and grade 1: patients who felt pain when walking. The results obtained showed that 60% were grade 4, 27% grade 3 and 13% grade 2.¹⁰ In our study, all the patients were able to return to competitive soccer without pain.

Another surgical option used in treating pubalgia is arthrodesis of the pubic symphysis. This procedure has the advantage of avoiding posterior instability as a complication

from anterior resection.¹¹ However, arthrodesis requires longer-duration surgery, with slower recovery and possible complications from using internal fixation, such as infection, breakage of the synthesis material and nonunion.¹² We did not use this technique in association with our cases because of the abovementioned complications.

There have only been a few reports on partial tenotomy of the long adductor in association with trapezoidal resection of the pubic symphysis, for treating chronic pubalgia. Favorable results following excision of bone avulsion fragments from the gracilis have been described.¹³ In our setting, another study used release of the fascia of the rectus abdominis, curettage of the pubic symphysis and partial tenotomy of the adductors, with excellent results among professional soccer players.¹⁴ In our study, with a different surgical technique, we obtained similar results regarding the return to sports activities.

This study presented certain limitations. The postoperative follow-up on the patients was not homogenous: there were cases in which after returning to sports activities, the soccer player did not come to any more consultations; the length of follow-up was short and future complications may still appear; and the sample was small and directed toward a specific group of sports players. At the beginning of this case series, there was no classification or standardization of the postoperative results, and the only criterion used for a good result was the return to sports activities. Today, it is now understood that other factors are involved in this type of sports player, and that the return to sports activities can occur even before complete resolution of the condition. Our study did not use a control group to compare surgical techniques, since there are no studies proving that any specific technique is particularly effective (gold standard) for this condition. The aim of this study was not to solve this question but, rather, to evaluate the return to sport when the technique used by our group is applied.

There are no specific questionnaires relating to pubalgia in the literature. The sports players considered that their return to sports activity and satisfaction level were excellent, since they had been debilitated and had been moved out of the main team, and the surgery enabled an improvement in their pain level and consequently in their performance. Although the questionnaire was simple and subjective, it allowed the patients' satisfaction level and the efficacy of the technique to be assessed over a short follow-up period for this specific population. In treating pubalgia among professional soccer players, indications for surgery should not be excessively postponed, because of the risk of loss of performance in the sport.

Conclusion

The surgical technique presented in this case series, with trapezoidal resection of the pubic symphysis in association with bilateral partial tenotomy of the long adductor is a fast and effective procedure with a low rate of postoperative complications. It was seen to be an excellent treatment option for refractory cases and for enabling a return to sports activities, among professional soccer players.

Conflicts of interest

The authors declare no conflict of interest.

REFERENCES

1. Pauli S, Willemsen P, Declerck K, Chappel R, Vanderveken M. Osteomyelitis pubis versus osteitis pubis: a case presentation and review of the literature. *Br J Sports Med.* 2002;36(1):71-3.
2. Fricker PA, Taunton JE, Ammann W. Osteitis pubis in athletes. Infection, inflammation or injury? *Sports Med.* 1991;12(4):266-79.
3. Coventry MB, Mitchell WC. Osteitis pubis: observations based on a study of 45 patients. *JAMA.* 1961;2(178):898-905.
4. Batt ME, McShane JM, Dillingham MF. Osteitis pubis in collegiate football players. *Med Sci Sports Exerc.* 1995;27(5):629-33.
5. Queiroz RD, Carvalho RT, Bento AO, Azevedo RM, Cohen M. Perfil das lesões pélvicas em atletas. *Rev Bras Ortop.* 2011;46 Suppl 2:72-8.
6. Karlsson J, Swärd L, Kålebo P, Thomée R. Chronic groin injuries in athletes. Recommendations for treatment and rehabilitation. *Sports Med.* 1994;17(2):141-8.
7. Choi H, McCartney M, Best TM. Treatment of osteitis pubis and osteomyelitis of the pubic symphysis in athletes: a systematic review. *Br J Sports Med.* 2011;45(1):57-64.
8. Grace JN, Sim FH, Shives TC, Coventry MB. Wedge resection of the symphysis pubis for the treatment of osteitis pubis. *J Bone Joint Surg Am.* 1989;71(3):358-64.
9. Mulhall KJ, McKenna J, Walsh A, McCormack D. Osteitis pubis in professional soccer players: a report of outcome with symphyseal curettage in cases refractory to conservative management. *Clin J Sport Med.* 2002;12(3):179-81.
10. Radic R, Annear P. Use of pubic symphysis curettage for treatment-resistant osteitis pubis in athletes. *Am J Sports Med.* 2008;36(1):122-8.
11. Moore Jr RS, Stover MD, Matta JM. Late posterior instability of the pelvis after resection of the symphysis pubis for the treatment of osteitis pubis. A report of two cases. *J Bone Joint Surg Am.* 1998;80(7):1043-8.
12. Williams PR, Thomas DP, Downes EM. Osteitis pubis and instability of the pubic symphysis. When nonoperative measures fail. *Am J Sports Med.* 2000;28(3):350-5.
13. Wiley JJ. Traumatic osteitis pubis: the gracilis syndrome. *Am J Sports Med.* 1983;11(5):360-3.
14. Sousa JP, Fallopa F, Siqueira Júnior D, Cruz AR. Tratamento cirúrgico da pubalgia em jogadores de futebol profissional. *Rev Bras Ortop.* 2005;40(10):601-7.